



Sustainability 401

Part 1: Houston, we have a problem

11 FEB 04
Maryland MP3 Meeting



Who's Here?

- *Who do you represent?*
- *Why are you here?*
 - ✓ Dedicated environmentalist
 - ✓ Wandered in by mistake, can't find the exit
 - ✓ Make sure the tree-huggers don't mess up my World
 - ✓ Other (Oh really? Like what?)

-In a USA Today survey – 3/4s replied that they were concerned about the environment but there is a wide spectrum of beliefs about the best way to treat the environment.

-for large group – AA intros take an informal poll



Learning Objectives



- *There's a problem – we are exceeding the earth's capacity to provide resources and absorb wastes*
- *There's a solution – “sustainability” is a framework that balances economy, well-being, and environment*
- *See what a few “organizations with vision” have accomplished*
- *Join the Quest to save the world*
- *Have fun*



**Please dim the lights
for the movie.**

- Start video at 1:55 on counter



**Houston, we have a
problem.**

- Apollo 13



The following slides are from our mentors, Mary and Brian Nattrass.



Dancing with the Tiger
Learning sustainability Step by Natural Step
2002

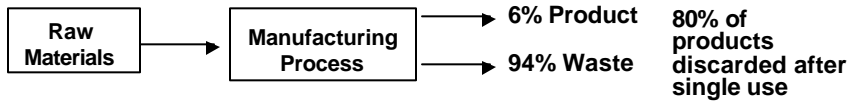
- The Nattrass's, bring lessons learned from corporate America
- They're very interested in working with all types of organizations (private and government including military) because it gives them great hope for creating a sustainable world
- We'll be giving away copies of their books as part of the class exercises



Some of the Natrass's clients – sustainability makes sense to everyone from Starbucks to Marines.

The Things We Use

Linear Industrial Processes: Waste is created faster than it can be reconstituted to quality resources. **Take-make-waste**



99% of original materials used in the production of, or contained in, the goods made in the US become waste within 6 weeks of sale.

(Attributed to Paul Hawken, *Factor 4*, 1997)

Material Flows of Tomorrow

In cyclical natural systems, waste does not exist.

Waste = Food.





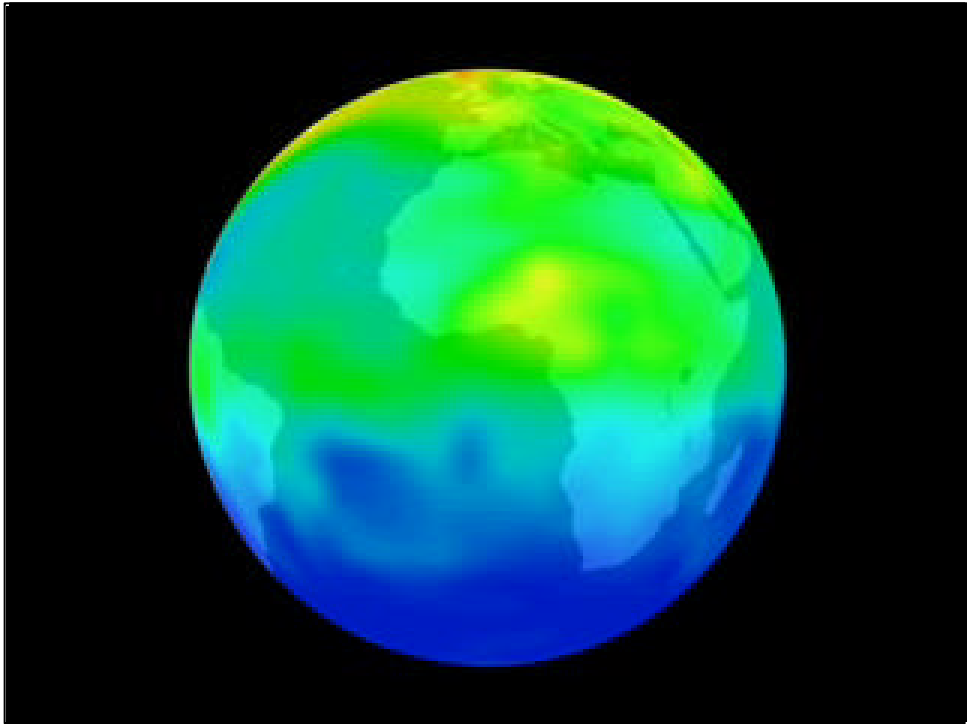
The Energy We Use



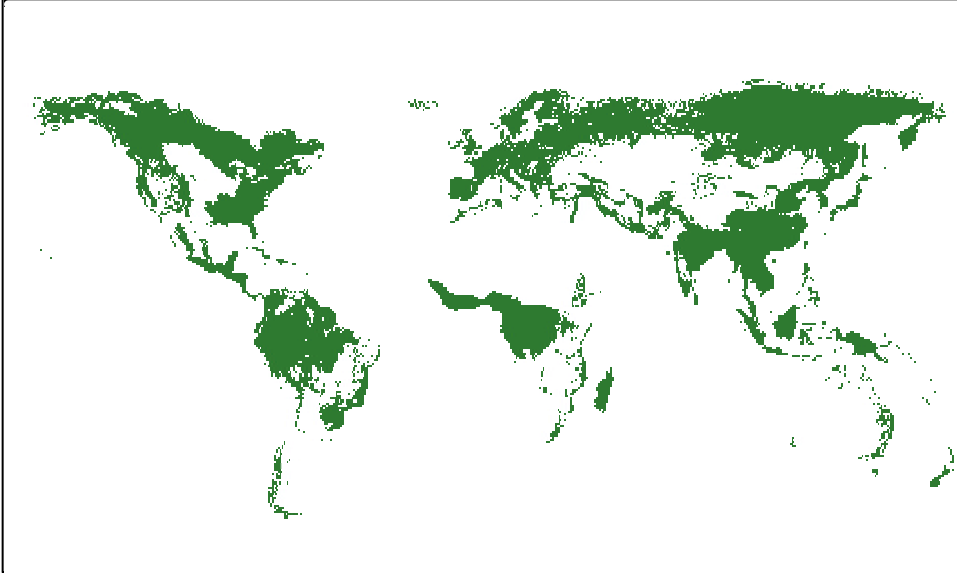
BP Statistical Review of World Energy 2002 provides the following estimates of fuel remaining if growth in the consumption rates stay steady:

- Oil – 40 years
- Natural Gas – 62 years
- Coal – 216 years

(<http://www.bp.com/centres/energy2002/index.asp>)



Frontier Forests 8,000 Years Ago

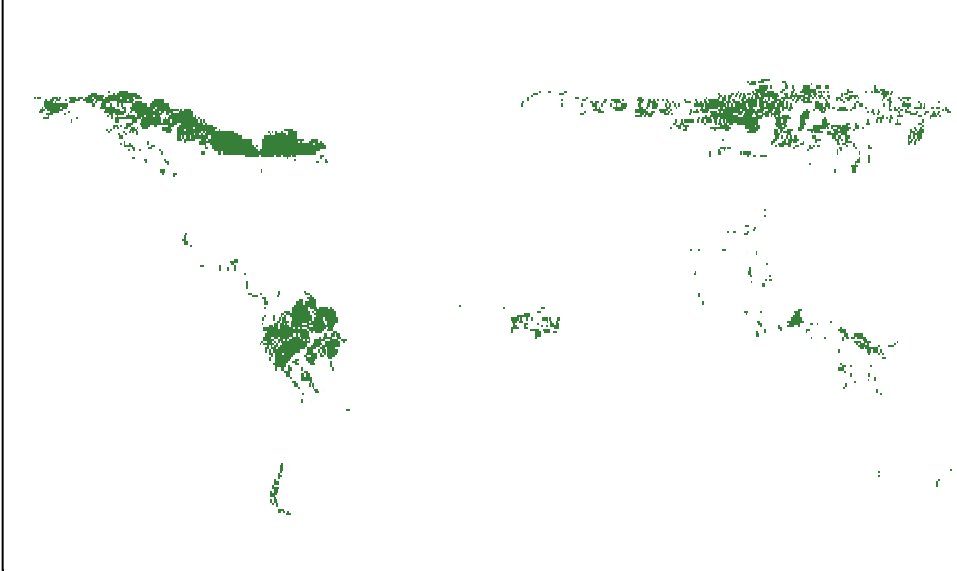


- Much of the data we're about to show you in on the web, before you leave we'll give you a handout of websites you can visit

Global Forest Watch PowerPoint Slide #3: Frontier Forests 8,000 Years Ago

- Here is a bit of history about Global Forest Watch.
- In 1997, the World Resources Institute published *The Last Frontier Forest, Ecosystems and Economies on the Edge*. This publication documented for the first time how much forest originally covered the Earth, how much we have lost, and where natural intact tracks of forests – frontier forests – exist today.

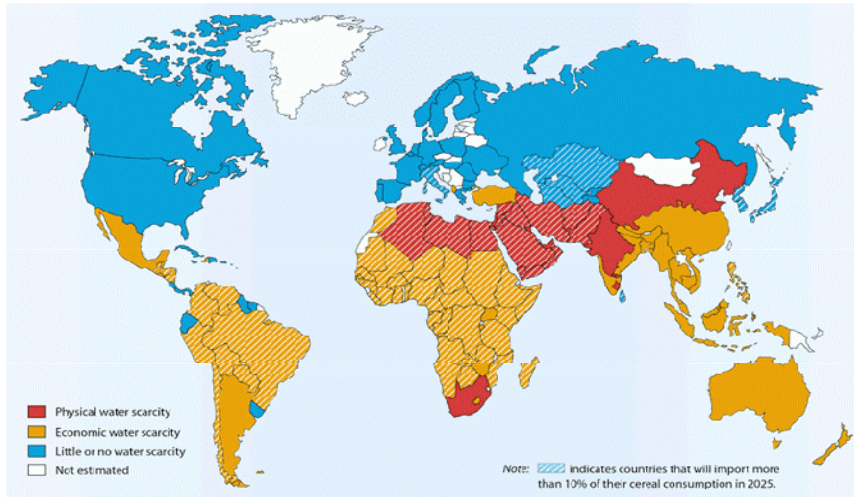
Frontier Forests Today



Global Forest Watch PowerPoint Slide #4: Frontier Forests Today

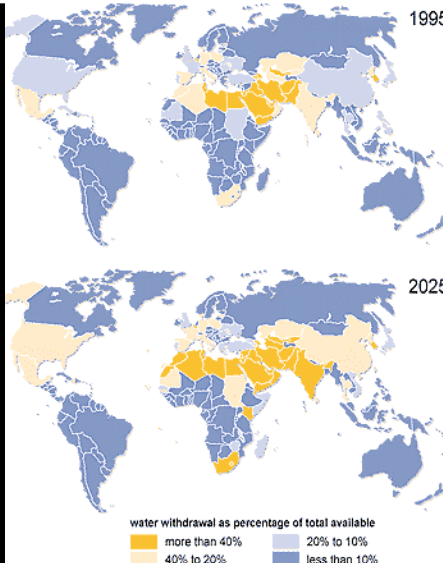
This study found that almost $\frac{1}{2}$ of the Earth's original forest cover is gone, and that only $\frac{1}{5}$ of the original cover remains as frontier forests. – forests large enough to sustain large populations of indigenous species even when faced with natural disasters such as fire and storms.

Water Scarcity



Source: International Water Management Institute 2002

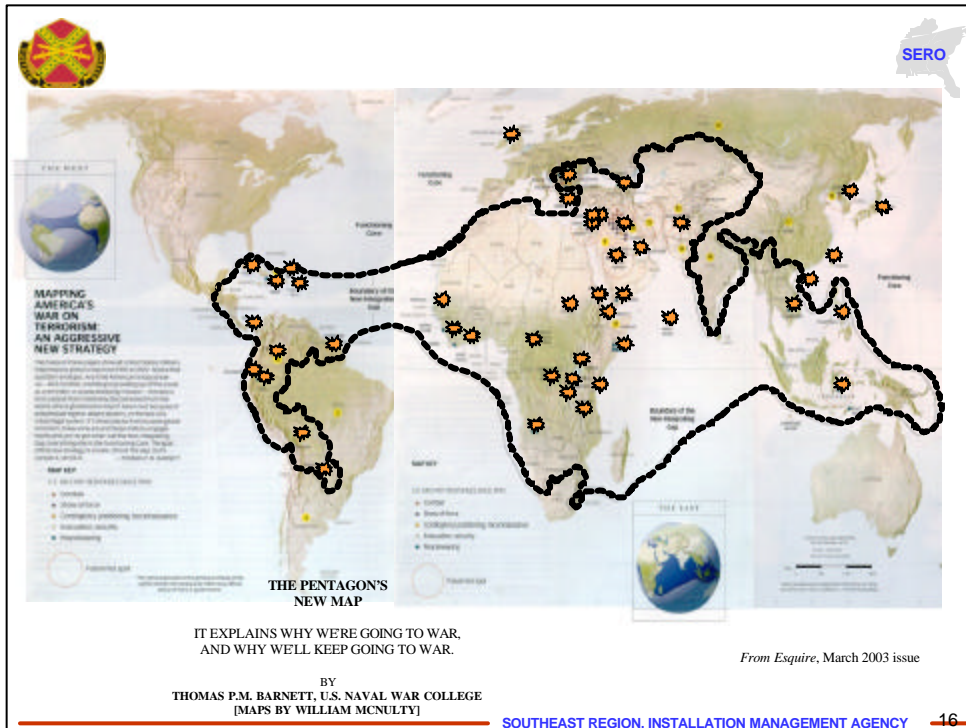
Water Scarcity is a Security Issue



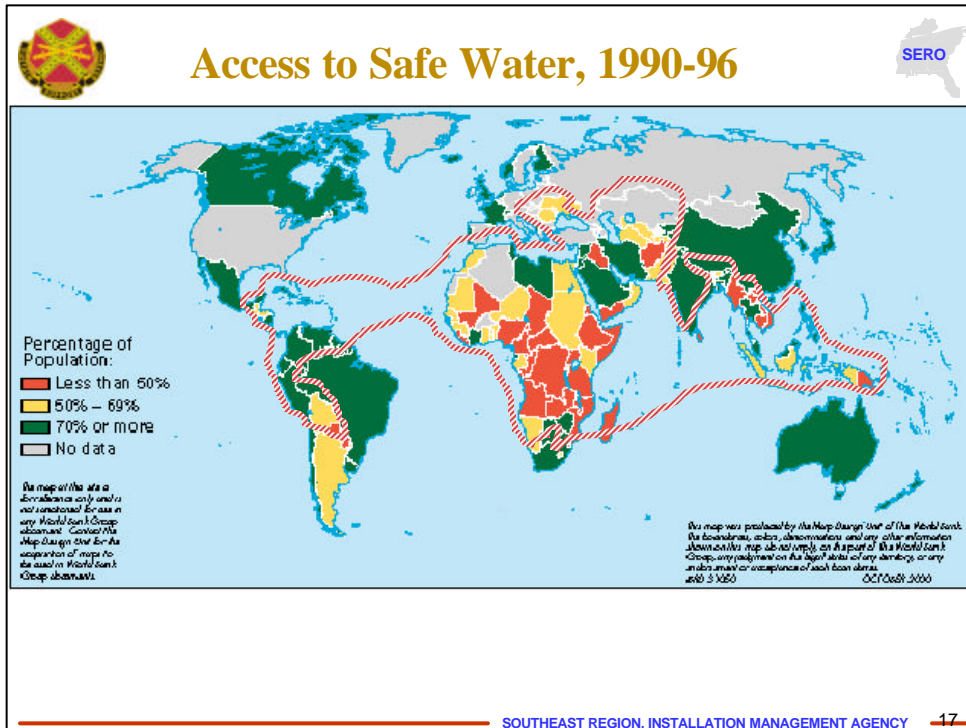
The US intelligence community predicts that changes in population and the spread of information and disease will increasingly threaten US national security.

Water scarcity, in particular, is expected to be a significant cause of instability around the world.

Global freshwater consumption rose sixfold between 1900 and 1995 - at more than twice the rate of population growth. About one-third of the world's population already lives in countries with moderate to high water stress - that is, where water consumption is more than 10 per cent of the renewable freshwater supply (see maps below). The problems are most acute in Africa and West Asia but lack of water is already a major constraint to industrial and socio-economic growth in many other areas, including China, India and Indonesia (Roger 1998). In Africa, 14 countries are already subject to water stress or water scarcity, and a further 11 countries will join them in the next 25 years (Johns Hopkins 1998). If present consumption patterns continue, two out of every three persons on Earth will live in water-stressed conditions by the year 2025 (WMO and others 1997). The declining state of the world's freshwater resources, in terms of quantity and quality, may prove to be the dominant issue on the environment and development agenda of the coming century.

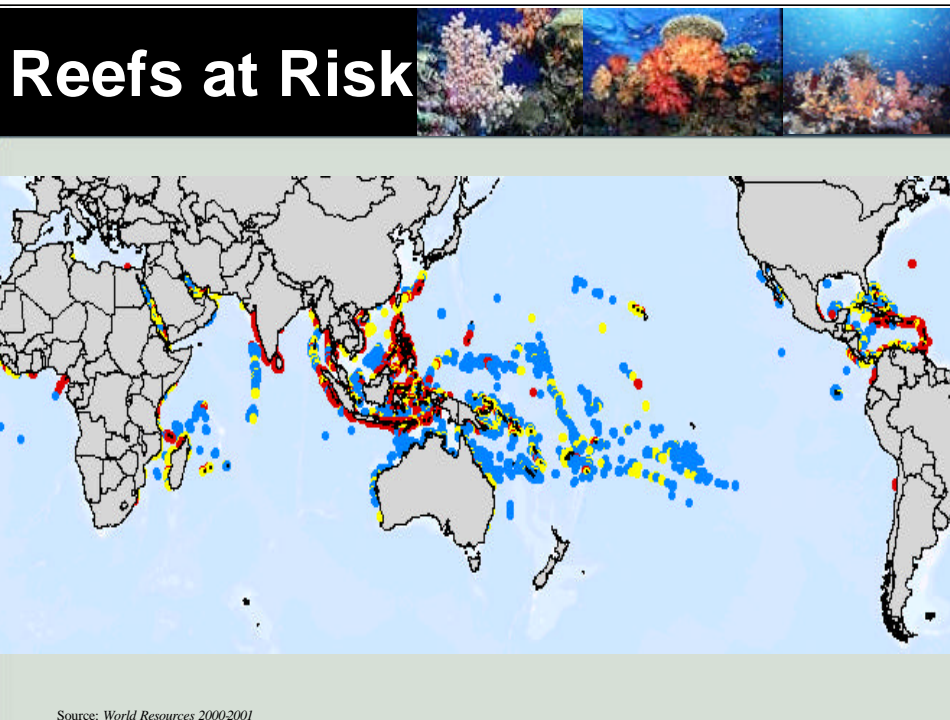


This map is from the article I sent from the Naval War College. I added the explosions enhanced the line.



“Access to safe water is measured by the number of people who have a reasonable means of getting clean water, expressed as a percentage of the total population. It reflects the health of a country’s people and the country’s ability to collect, clean, and distribute water. Countries in which few people have access to safe water tend to be located in Africa and Asia. Countries in which most people have access to safe water tend to be located in Europe, North America, and parts of Asia and South America.”

This map is from UNESCO.



WRI worked with partners at the International Center for Living Aquatic Marine Resources in the Philippines, and the World Conservation Monitoring Centre in the U.K and----with the help of leading coral reef experts from around the world----to map where reefs are at risk from overfishing, coastal development and other human activities.

X% of the world's people depend for their food on fish that breed in the reefs. If the reefs crash, these people will be hungry and highly motivated.

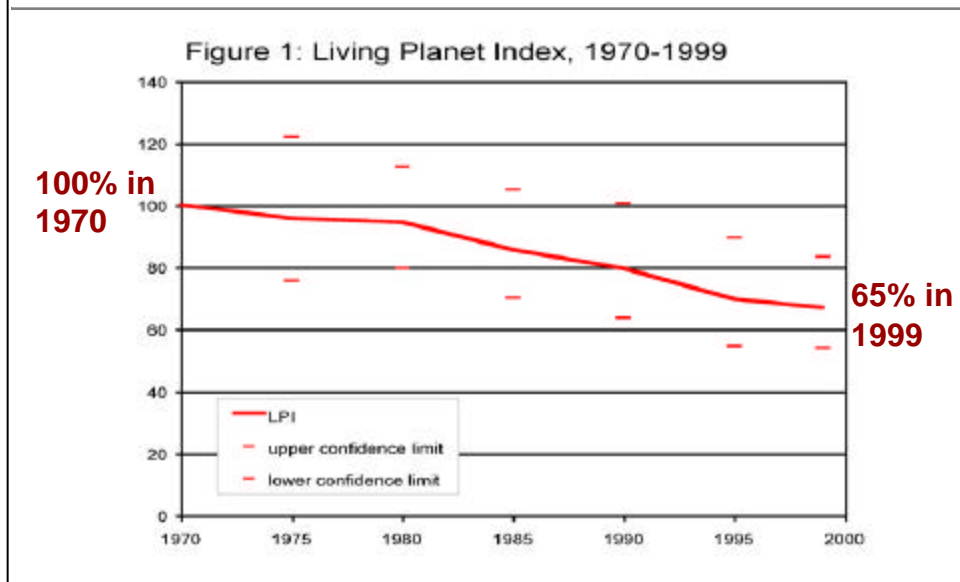


The Food We Eat

- The energy used to produce 1 lb of meat could yield 40 lb of soybeans
- 1 lb of meat requires 2500 gallons of water to produce. 1 lb of wheat requires 25 gallons.
- Meat production currently requires 56% of the agricultural land used in the US.


If everyone in the world ate like us...

Living Planet Index





Every living system on the earth is in decline.

The Living Planet Index (LPI) is derived from trends over the past 30 years in populations of hundreds of species of birds, mammals, reptiles, amphibians and fish. Between 1970 and 2000, it declined by about 35%. The LPI is the average of three ecosystem-based indices. The forest species population index declined by about 15%, the marine species population index fell by about 35%, while the freshwater species population index dropped 55% over the 30-year period. The stark trends indicated by the LPI are a quantitative confirmation that the world is currently undergoing a very rapid loss of biodiversity comparable with the great mass extinction events that have previously occurred only five or six times in the Earth's history.



Ecological Footprint





{

The Ecological Footprint of any individual is the sum of several separate components:

- » Growing crops,
- » Grazing animals,
- » Harvested timber
- » Catching fish and productive marine products,
- » Accommodating infrastructure
- » Burning fossil fuel

The Ecological Footprint is measured in "area units". One area unit is the equivalent of one hectare of world average productivity.

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Now that we understand the rate at which the world's population grows, let's think about how much area it takes to support a person. This is called the Ecological footprint. It can be different for different people, depending on their lifestyle. Factors that can affect your footprint are diet, housing, transportation, energy consumption, water consumption etc.

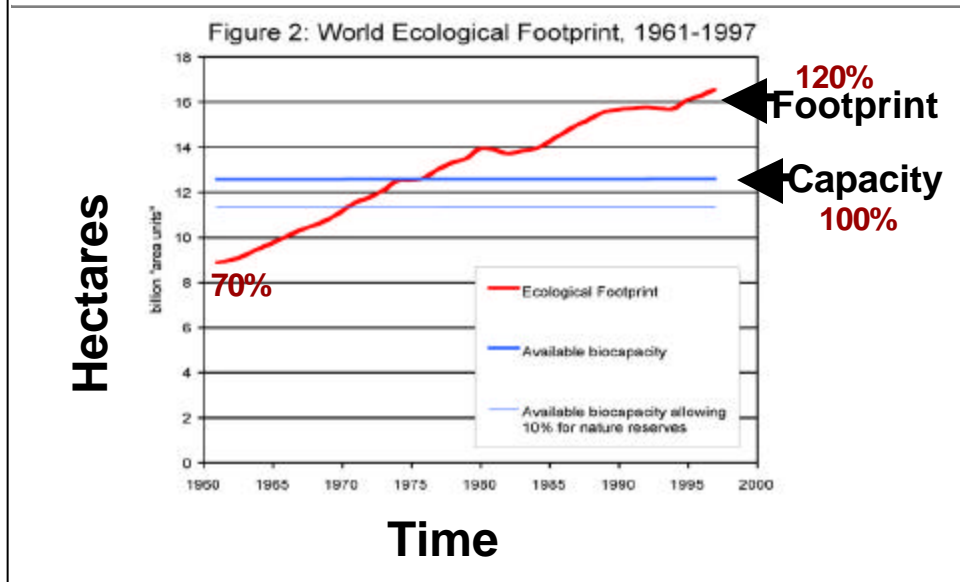
Components of the Ecological Footprint

- [Growing Crops](#)
- [Grazing Animals](#)
- [Harvesting Timber](#)
- [Catching Fish](#)
- [Accommodating Infrastructure](#)
- [Absorbing Carbon Dioxide Emissions](#)

Our accounts include six mutually exclusive uses of the planet's bioproductive surface that compete for the Earth's available biologically productive space. We express these categories in standardized global acres and add them up to determine the total Footprint of a given population. The following notes are for the 2001 national accounts update.

Growing crops for food, animal feed, fiber, oil crops, and rubber occupies arable land, the most productive land of all. The United Nations Food and Agriculture Organization (FAO) estimates that today there are about 3.2 billion acres of arable land worldwide—not including arable land used as pasture. Using FAO harvest and yield data for 18 categories of crops, we

World Ecological Footprint



9:30-10:15

The Ecological Footprint (EF) is a measure of the consumption of renewable natural resources by a human population, be it that of a country, a region or the whole world. A population's EF is the total area of productive land or sea required to produce all the crops, meat, seafood, wood and fibre it consumes, to sustain its energy consumption and to give space for its infrastructure. The EF can be compared with the biologically productive capacity of the land and sea available to that population.

The [Living Planet Report](#) is WWF's periodic update on the state of the world's ecosystems - as measured by the Living Planet Index - and the human pressures on them through the consumption of renewable natural resources - as measured by the Ecological Footprint. There is a cause- effect linkage between the two measures.

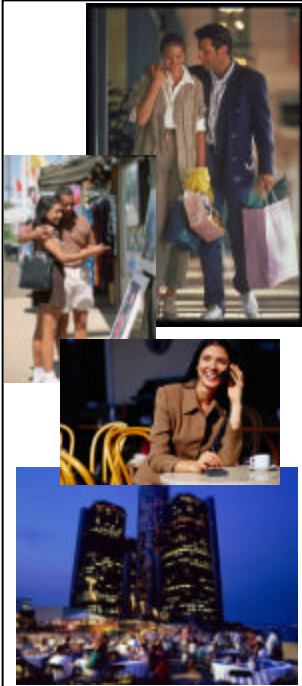
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Figure 2 - World Ecological Footprint The Earth has about 11.4 billion hectares of productive land and sea space, after all unproductive areas of icecaps, desert and open ocean are discounted, or about a quarter of its surface area. Divided between the global population of six billion people, this total equates to just 1.9 hectares per person. While the EF of the average African or Asian consumer was less than 1.4 hectares per person in 1999, the average Western European's footprint was about 5.0 hectares, and the average North American's was about 9.6 hectares.

The EF of the world average consumer in 1999 was 2.3 hectares per person, or 20% above the earth's biological capacity of 1.90 hectares per person. In other words, humanity now exceeds the planet's capacity to sustain its consumption of renewable resources. We are able to maintain this global overdraft on a temporary basis by eating into the earth's capital stocks of forest, fish and fertile soils. We also dump our excess carbon dioxide emissions into the atmosphere. Neither of these two activities are sustainable in the long-term - the only sustainable solution is to live within the biological productive capacity of the earth.

However, current trends are moving humanity away from achieving this minimum requirement for sustainability, not towards it. The global ecological footprint has grown from about 70% of the planet's biological capacity in 1961 to about 120% of its biological capacity in 1999. Furthermore, future projections based on likely scenarios of population growth, economic development and technological change, show that humanity's footprint is likely to grow to about 180% to 220% of the Earth's biological capacity by the year 2050.



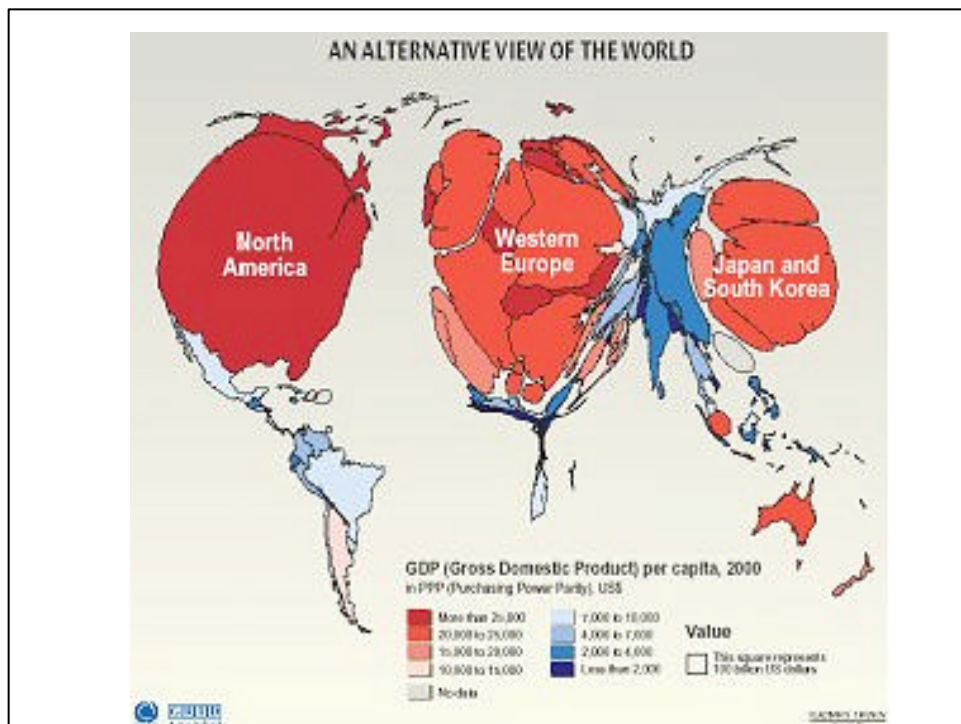
Intended Consequences – Meet Human Needs

- Prosperity
- High Quality of Life
- Strong economy
- Incredible array of goods and services

Unintended Consequences – a crashing biosphere and disenfranchised people

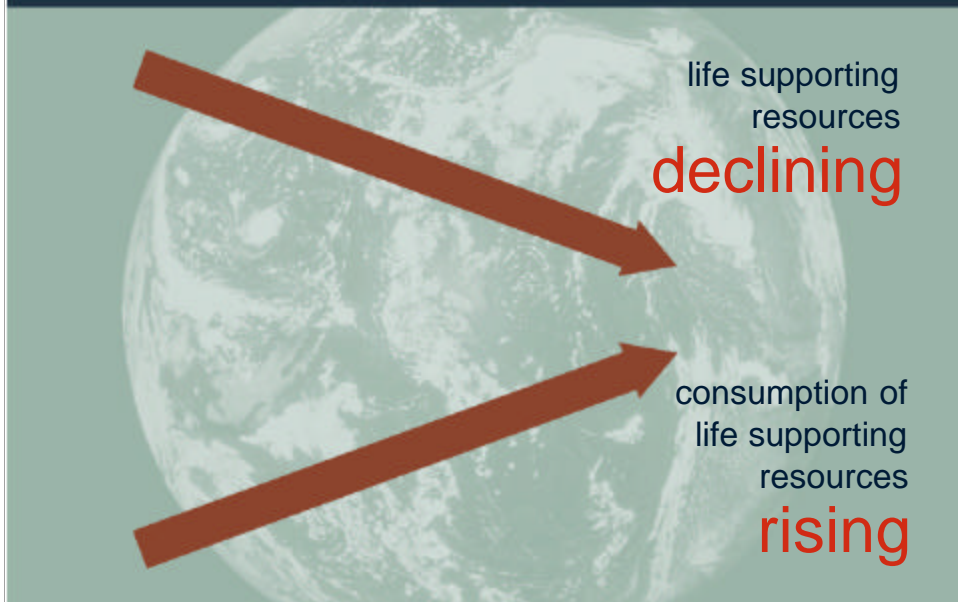
“Only once in the history of this planet -- now -- have total flows and movement of materials by one species matched or exceeded natural planetary flows.”



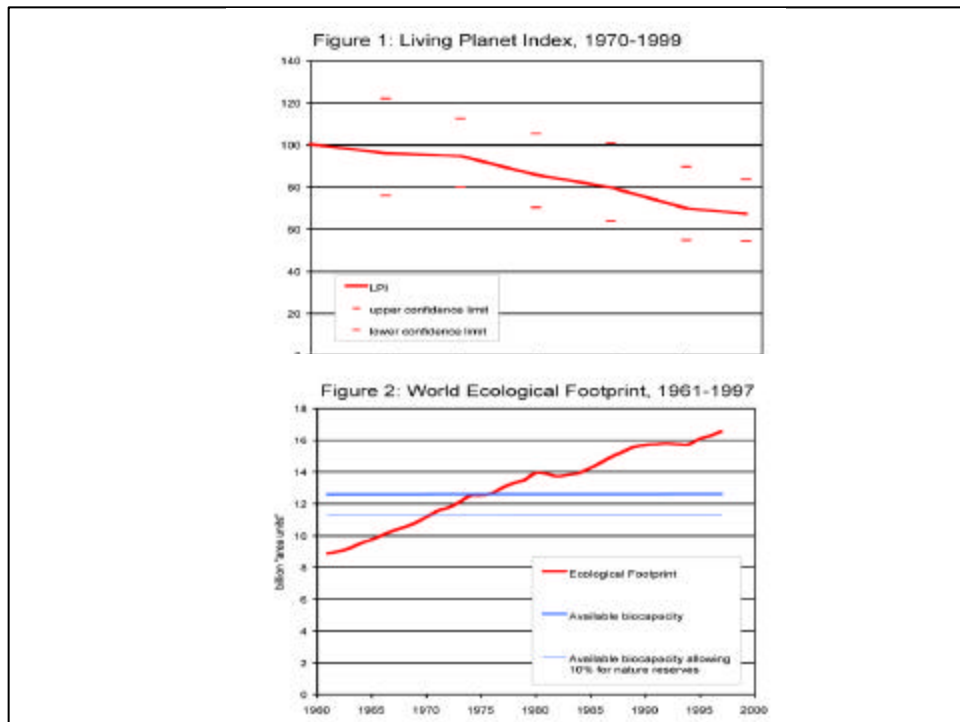


9:30-10:15

A Global Perspective



- human vs natural capital as constraints



9:30-10:15

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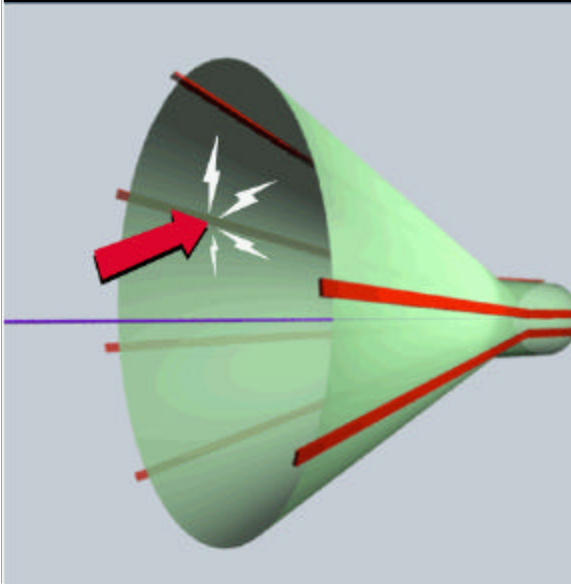
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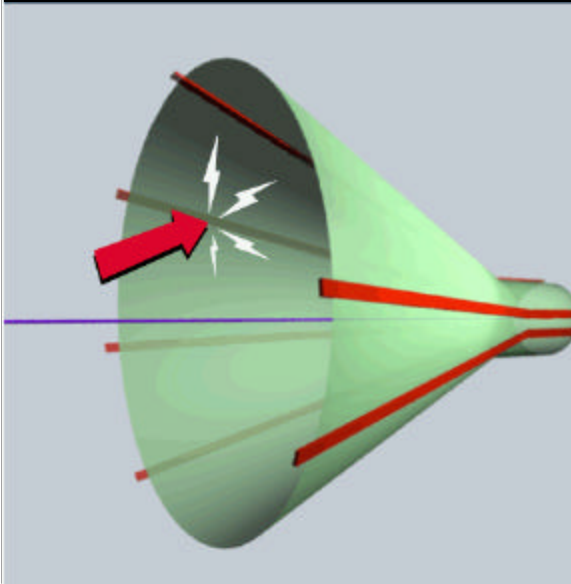
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CORPORATIONS: Hitting the Wall



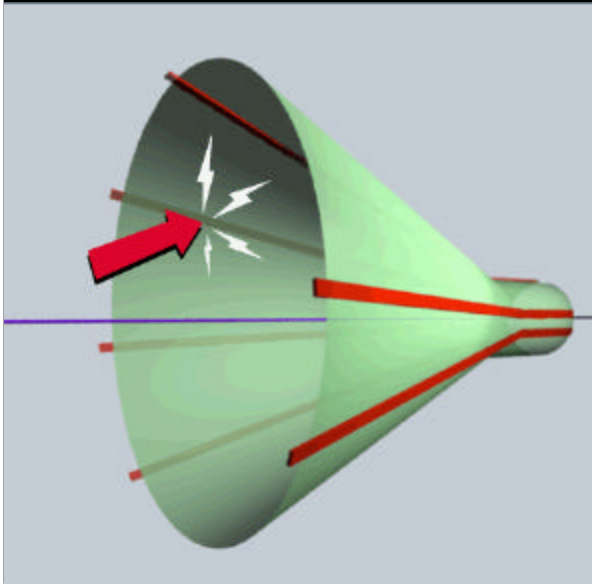
- Bad Publicity
- Boycotts
- Loss of Markets
- Litigation
- Employee dissatisfaction
- Government regulation
- Increased costs

MUNICIPALITIES: Hitting the Wall



- Ecological degradation
- Limits to economic development
- Bad publicity
- Increased pressure on resources
- Increased costs
- Healthy, safety and security concerns

Military Installations/Bases: Hitting the Wall

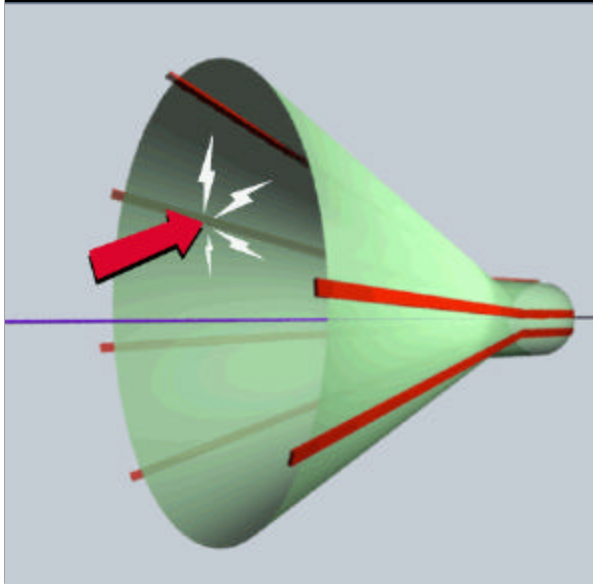


GROUP EXERCISE

**What are the effects on
YOUR BASE of the
world-wide decline in
natural resources and
rising consumption?**

- Form 5-person teams to talk about it for 2 minutes
- Discuss thoughts in large group
- Give away books to those who volunteer a (unique) answer

Military Installations/Bases: Hitting the Wall



- constraints on military mission
- public concerns
- reduced well-being
- resource scarcity
- rising costs
- degradation of air, land, water
- competition for resources



ENCROACHMENT



We hear a lot about Homeland Security these days...But we mistakenly think our "homeland" is the US.

We all need to take a step back and "see" our homeland (planet)



Depressed Yet?



"More than at any time in history, mankind faces a crossroad. One path leads to despair and utter hopelessness; the other to total extinction. Let us pray that we have the wisdom to choose correctly."

Woody Allen



And now on to The Most Important Question in Life...

SOUTHEAST REGION, INSTALLATION MANAGEMENT AGENCY 34

- Depressed yet?
- Most important question in life – what to do next?
- We really can't do much about the population (except hope) but we can certainly influence our consumption and the technologies we pursue and employ..
- So what can we do about the fact that our earth – our life support system – appears to be crashing and burning?
- We have lots of options – including accepting the “hopelessness of the situation and doing absolutely nothing”
- Come back after a 5-min break to find out – and to share some chocolate, a sure antidote to depression.